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ABSTRACT

Syntax in four published series of elementary school readers was analyzed to discover patterns of complexity increasing from first to sixth grade, to identify structures accounting for differences across the grades, and to compare the frequency of specific structures among the series. Analyses of 16 surface structures representing complexities derived from deep structure indicated an overall increase in syntactic complexities from first to sixth grade in all series. Patterns of increases were irregular, showing no evidence of systematic planning. A sharp increase in the number of total structures was found from first to second grade in the three series. There was a leveling off in the middle grades and another sharp increase from fifth grade to sixth. Significant differences among the series in the use of particular structures occurred most frequently in the middle grades. (Author/AA)

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FINAL REPORT

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SYNTAX PATTERNS IN ELEMENTARY SCHOOL READERS

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Title Page

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Syntax Patterns In Elementary School Readers

The study reported here was addressed to the problem of reading comprehension in elementary school. The problem is of special interest because of reports that disadvantaged children's progress in reading ability declines as they progress in school (Office of Educational Evaluation, 1975). The focus of the investigation was on the syntactic features of elementary school basal readers which are the basic books presented to all children. The focus was selected as a possible source of knowledge for reversing the trend in reading disability. Socioeconomic status seems to play a consistent differential role in language development, with low income-class children showing less ability than their middle class peers (Cazden, 1972). The same pattern emerges when reading scores are examined: poor children's reading skills develop more slowly and they are almost always consistently lower at each grade level than those of middle class students.

The study was designed to answer four main questions: Is there a sequential pattern of increasing complexity presented to children as they progress from Grade one to Grade six?

If there is a pattern of increasing complexity, which syntactic structures account for the differences from first to sixth grade?

Is there a difference in increasing frequency of occurrence of particular syntactic structures in succeeding grades?

Is there a difference in occurrence of particular syntactic structures among published series in each grade?

Related Research

The selection of the focus was guided by theoretical and empirical evidence of a close interrelation between reading comprehension and the development of skills in understanding language. Three lines of research were considered. First, psycholinguistic models of the reading process suggest that language processing is a central aspect of reading (Goodman, 1970; E. Brown, 1970; F. Smith, 1971). While the theorists differ in details of explication, they share the focal premise that whatever perceptual and cognitive variables may be involved in reading, the understanding of language is a constant factor that is operative. Second, there is evidence of a positive relationship between children's familiarity with certain patterns and their reading comprehension (Ruddell, 1965; Robertson, 1968; Bormuth et al., 1970; Fagan, 1971). A third line of research indicates that children's understanding of complex gram-

matical structures develops in an orderly sequence as a function of cognitive maturity and experience (Fagan, 1971; W. Smith, 1971; C. Chomsky, 1969). Increments of complexity in language production were reported related to development by Hunt (1965) and O'Donnell et al. (1967). The foregoing research was concerned with school age children. R. Brown (1973), summarizing psycholinguistic studies of preschool children, concluded that the order of acquisition of knowledge of any child's first language will prove to be invariant in all future research (p. 403).

It has been assumed in education that successive grade levels make use of reading texts which contain increasingly more complex materials. Indeed, readability formulas are used to ascertain the complexity of books according to grade levels (Zintz, 1972). However, these formulas do not account for the syntactic complexities. From the earliest one published in 1928 to the more recent one developed by Fry (1972), the focus has been on the familiarity of words or difficulty of words as indicated by numbers of syllables and on the number of words in sentences. These techniques cannot differentiate between levels of complexity of two sentences of equal length, such as John is eager to see and John is easy to see. Yet, Kessel (1970) confirmed C. Chomsky's finding that there is an invariant developmental sequence in which the former sentence is understood before the latter.

MacGinitie and Tretiak (1971) compared the utility of readability formulas to the linguistic depth and sector procedures of Yngve and Allen, respectively. They found that these techniques yielded no new information on the complexity of reading materials. Granowsky and Botel (1974) suggested a method for identification of syntactic structures that affect readability, but their instrument was presented as a directional effort only. They accounted for a small number of subordinate clauses. Endicott's (1973) scale for syntactic complexity was developed from a base of the number of transformations, but Fagan (1971) found that kinds and not numbers of transformations were an effective criteria for comprehension.

If reading is essentially a matter of language processing, and if understanding of syntactic constructions is correlated with reading comprehension, and further, if ability to comprehend grammatical units is a developmental phenomenon, then understanding the grammar of written materials may be a keystone for improving abilities in reading. However, a search of the literature yielded few descriptions of patterns of syntax which are presented to pupils over a period of years in school.

Strickland's (1962) and Levy's (1974) reports of discrepancies between the oral language produced by children and the written language in school readers were strong indications of potential

comprehension problems for pupils. Pflaum's (1975) finding of erratic presentations of five syntax features in intermediate level readers suggested a need for further study of the books. In order to study the effect of syntactic complexities on children's reading comprehension we need to know just how complex the syntax actually is in the readers at different grade levels. Such information should be useful not only as a basis for further research, but also for the practical problems of teaching. With additional information about the grammatical tasks presented by the readers, teachers would be in a better position to identify language barriers to comprehension and to provide help to children as needed.

Procedures

Structures Selected

Sixteen grammatical patterns were identified as surface structures which represent underlying complexities. They were selected on the basis of their appearance as difficulties in language development research. Most of the structures have some deleted elements, from which the reader must infer the deep structure in order to understand the sentence. The theory of transformational grammar as presented by N. Chomsky (1965, 1972) and Liles (1971, 1972) was the source for criteria for identifying the structures.

The structures selected do not include all the syntactic complexities which children encounter in the basic readers, partly because a complete grammar of English has not yet been written but also because such an undertaking was not feasible in the present study. It will be noted, for example, that question transformations and negatives were not included. Transformations which require merely positional shifts in sentences but no deletions were also not included. Imperatives, genitive+noun, and adjective+noun structures were excluded because they were found with such frequency in the oral language of inner city first grade children (Levy, 1974) that they were considered unlikely to present comprehension problems in reading.

The sixteen syntactic structures identified in the books are listed below. Initials used in the tables where data results are reported are in parentheses after each structure's category name. Also listed are the rules used for selection of the structures and prototype sentences from the books with each structure of interest underlined. In sentences which contain only a deletion, the underlining extends from the middle of the preceding word to the middle of the following word. More than one illustrative sentence is given for clarification where misunderstanding seemed possible.

1. Relative Restricted Clause with Pronoun Stated (RRCPS). The clause modifies a noun and defines or restricts its use. The modified noun is replaced by a pronoun as subject of the clause.

Sample sentence: There is one insect that does not help the morning-glory.

2. Relative Restricted Clause with Pronoun Deleted (RRCPD). The clause modifies a noun as in RRCPS. The relative pronoun is deleted in the clause.

Sample sentence: With the money I get from this milk, I am going to buy some chickens.

3. Relative Appositive Clause with Pronoun Stated (RACPS). The clause modifies a noun by attribution of additional or incidental information. The modified noun is replaced by pronoun as subject of the clause.

Sample sentence: In Egypt, which is located in the northeastern part of Africa, you can still see the ruins of one of the oldest civilizations in the world.

4. Relative Appositive Clause with Pronoun Deleted (RACPD). The clause modifies a noun as in RACPS. The relative pronoun is deleted in the clause.

Sample sentences: Once upon a time a powerful magician named Merlin was walking down a hot, dusty road.

I saw John, dressed in his warmest clothes, across the street.

5. Relative Clause in Infinitive Verb Phrase Form (RCIV). The clause modifies a noun, has no stated nominal as subject, and its verb is infinitive, that is, has no tense marker.

Sample sentences: I need a boy to milk cows.

"That's the rainbow, little son," said his mother, "to show the storm has passed."

6. Relative Clause in Prepositional Phrase Form (RCPP). The clause modifying a noun has its noun and verb deleted so that it appears as a prepositional phrase, with a preposition and a noun phrase. The noun phrase in the prepositional phrase may contain a nominalized adjective or noun.

Sample sentences: The road from the mountain was long.

They could find their way to the best hunting grounds.

Do you know the meaning of the two words printed in heavy black letters?

7. Noun Deleted in Compound Predicate (NDCV). The noun(s) is deleted in a sentence which contains two verbs connected by a coordinating conjunction or by a comma and a coordinating conjunction, as in a series. The deleted noun(s) is the same as the stated noun which is the subject of the coordinated verbs.

Sample sentences: So he tied a rope around the calf's neck and led it to the castle.

Mary leaped across the stones, jumped over the edge of the water, and caught the dog.

8. Verb Deleted with Compound Subject (VDCS). The verb(s) is deleted in a sentence which contains two subjects connected by a coordinating conjunction or by a comma and a coordinating conjunction, as in a series. The deleted verb(s) is the same as the stated verb.

Sample sentences: Canada and the whole United States could fit into it.

Still the cow, the horse, and the people were chasing him and he had to cross the river to keep out of their reach.

9. Noun and Verb Deleted with Compound Complement (NVDCC). Noun and verb are deleted in a sentence which contains two complements connected by a coordinating conjunction or a comma. The deleted noun and verb are the same as the stated ones and dominate the coordinated complements.

Sample sentences: Janet had two party dresses and seven school dresses.

The children sit down on the benches and on the ground or on special stools.

10. Noun Deleted with Verb in Infinitive Phrase Form (NDIV). Two verbs are in immediate succession or separated by a complement of the first and the second verb has no stated subject and tense marker. The deleted noun may be the same as the subject of the first verb or it's complement.

Sample sentences: A crowd gathered to see the sight.

He taught them to be kind and to be strong when misfortunes came to them.

11. Element Deleted-Miscellaneous (EDM). One word is deleted in a construction not specified in categories 1-10. It may be a noun in an ellipse or in a raised, embedded sentence. It may be the preposition for an indirect object. It may be a noun or a verb in a clause, but not in imperatives.

Sample sentences: Probably have to wear a hat, though.

Then he stopped, staring with his mouth open.

The captain of the ship told them the story.

12. Noun and Verb Deleted in Miscellaneous Clauses (NVDMC). The noun and verb are deleted in comparisons where the comparison is not stated, in adjective modifiers which follow nouns, and in ellipses.

Sample sentences: They are the greatest reward of all.

Mary had never seen such treasures as lay before her.

The one mother made for me.

This is my valley green.

13. Noun Deleted in a Passive Verb Construction (PV). The agent or instrument of the verb, which would be the subject if the verb were active is either deleted or appears in a prepositional phrase following the verb.

Sample sentences: But when the food

was brought out, mice ran out.
In ancient times the Egyptians were ruled by kings.

14. Pronoun Beyond Immediately Preceding Noun Antecedent (PBIN). This is a pronoun whose antecedent is not stated in the sentence or is not the nominal which precedes it in the sentence.
Sample sentences: You have a gruff voice and we know you are the wolf.
Many a time he has moved heavier loads easily.

15. If Clause (IF). A sentence or clause introduced by if.
Sample sentences: If we all stood on our heads, would the rain start falling?
I asked Jim if he wanted to go with me.

16. Nominalization (NOM). Includes gerundives and derived nominals which function as adjectives or nouns. The derivation must be from a verb by addition of an affix but not an agent or instrument formed by addition of er as in teacher.
Sample sentences: Next to scrounging, eavesdropping on human beings was what he enjoyed most.
They zoomed in on him like a bombing squadron.
Mary's invitation to John pleased him.

Books Selected

Four publishers' series of books were selected for analysis. All of the basic readers for each of the six elementary grades were included in the selection pool, beginning with the first book that presented continuous discourse.
The series were:

Open Court Basic Readers, published in 1972
The Houghton Mifflin Readers, published in 1974
Harper & Row Design for Reading, published in 1972
The Holt Basic Reading System, published in 1973

Sampling Method

Following are the rules used to obtain samples of sentences for books.

1. From a published series which has readers designated as a basic series for Grades one through six, the book or books designated for each grade were selected. Supplementary readers which are optional or workbooks were not included.

2. The books for each grade were divided into tenths.

3. If the page at the decile point contained only a title, a picture, a poem, a list of words, or a study exercise, the next following page which did contain continuous prose text was selected.

4. On the selected page, the first complete sentence and the next nine sentences on that and the immediately following pages were marked for analysis.

5. If full page pictures or study exercises or captions intervened in the course of finding ten sentences, they were omitted and selection of sentences continued until 10 were chosen.

6. A group of words beginning with a capital letter and ending with a period, question mark, or exclamation point was counted as a sentence.

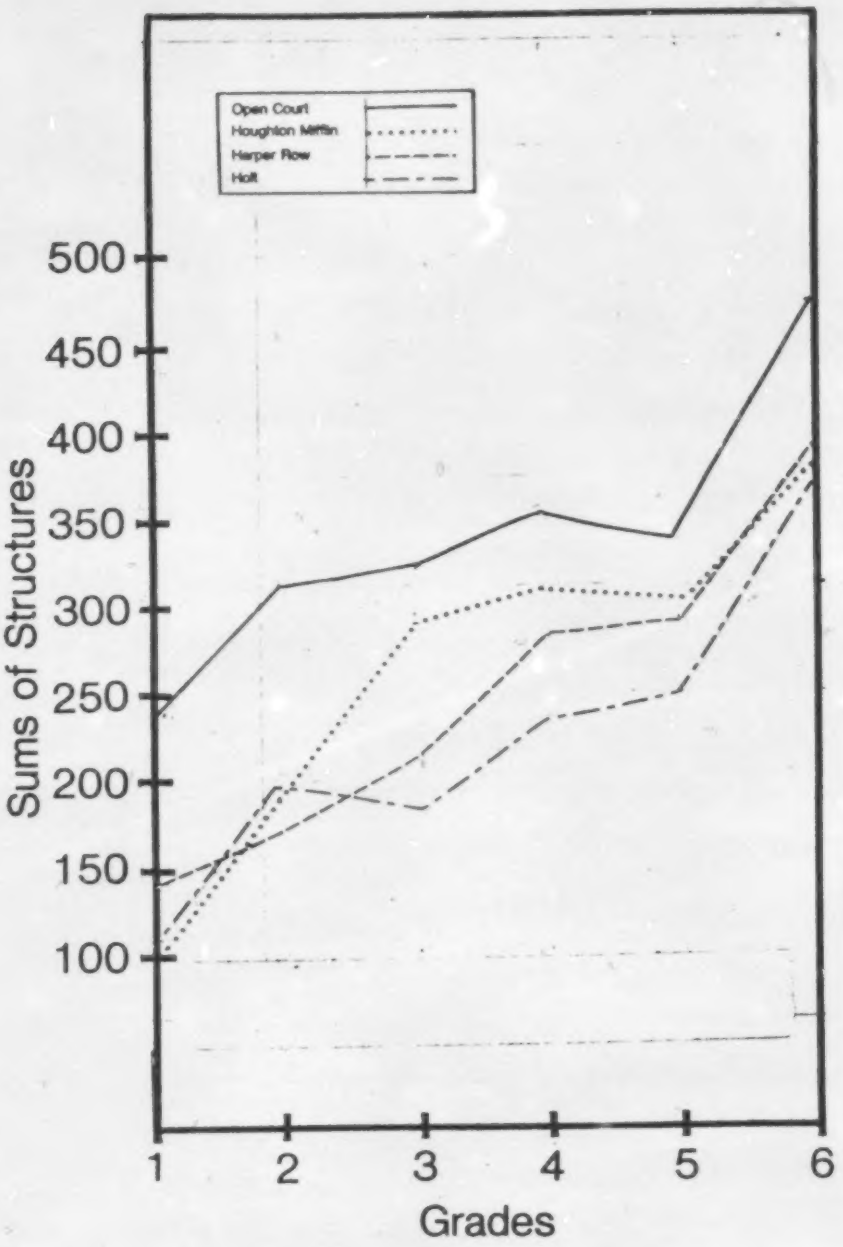
Thus, for each of the four publishers, 100 sentences from each of the six readers, Grades 1-6, were analyzed. A count was made of the frequency of occurrence of each of the 16 structures in the 100 sentences in each book.

Results

The first question asked whether there is a sequential pattern of increasing complexity of syntactic structures in elementary school readers from Grades 1-6. Figure 1 shows that there is an overall increase in occurrences of the group of 16 structures from first grade to sixth. Evidently the selected structures do reflect a general plan for increasing the difficulty of the readers. The irregularity of the patterns, however, suggests that a systematic sequence has not been developed. Children are not presented with a

Insert Figure 1 about here

Figure 1
Frequency of occurrence of 16 (totals) syntactic structures in Grades 1-6 in 4 series of readers



steadily increasing number of the structures as they progress through the school grades.

There is a leveling off in the middle grades: in the Houghton Mifflin series from Grades 3 to 5, in Holt from Grades 4 to 5 and in Open Court from Grades 2 to 5. There are even some decreases, in Holt from Grades 2 to 3 and in Open Court from Grades 4 to 5. The increase in number of complexities is fairly evenly distributed in the Harper & Row series. The other three series are more erratic in their sequences. They also have their sharpest increases in the very early grades and again in the last two grades.

Open Court Stands out among the publishers in having the largest number of the complex structures at every grade level and very sharp increases from Grades 1 to 2 and from 5 to 6. Houghton Mifflin becomes noticeably more complex than both Harper & Row and Holt by the third grade. Holt has a relatively low level of complexity in the middle grades but is comparable to the other publishers by the sixth grade.

Table 1 shows statistical evidence for the trends observed in Figure 1. Table 1 records the grade levels at which there are statistically significant increases ($p = .05$) in the sums of the

Insert Table 1 about here

16 syntactic structures, as calculated in a two-tailed multinominal distribution program. These data show that the total number of structures increase significantly from fifth to sixth grade for all the publishers. For all but Harper & Row, they also increase significantly from first to second grade. There are fewer significant increases in succeeding grades in the middle elementary years. Only Harper & Row and Holt increase the sums of the syntactic complexities significantly between Grades 3 and 4. None of the publishers increase the sums of structures significantly between Grades 4 and 5. Two publishers increase the sums significantly between Grades 2 and 3.

Combining the data from Figure 1 and Table 1, some description of what is required of children when they read emerges. By second grade they generally must begin to process a much larger number of syntactic structures than they had done in the preceding year. The demand for processing grammatical complexities continues but may level off, then increases significantly again when they move to the last year in elementary school.

As an aid in reading the remaining report of results, a concise list of the initials used to identify the syntactic structures in the tables and figures is provided below, together with the names of structures spelled in full.

Table 1

Sums of 16 Syntactic Structures Which Increase Significantly ($p = .05$) in Frequency at Succeeding Grade Levels in Four Series of Readers

Open Court	Houghton Mifflin	Harper & Row	Holt
2>1	2>1	3>2	2>1
6>5	3>2	4>3	4>3
	6>5	6>5	6>5

RRCPS: relative restricted clause with pronoun stated
RRCPD: relative restricted clause with pronoun deleted
RACPS: relative appositive clause with pronoun stated
RACPD: relative appositive clause with pronoun deleted
RCIV: relative clause in infinitive phrase form
RCPP: relative clause in prepositional phrase form
NDCV: noun deleted in compound predicate
VDCS: verb deleted with compound subject
NVDCC: noun and verb deleted with compound predicate
NDIV: noun deleted with verb in infinitive phrase form
EDM: element deleted, miscellaneous (noun, verb, or preposition)
NVDMC: noun and verb deleted in miscellaneous clauses (ellipses, comparisons, and adjectives following nouns)
PV: noun deleted in a passive verb construction
PBIN: pronoun beyond immediately preceding noun antecedent
IF: clause introduced by if
NOM: nominalization

The second question asked which structures account for the pattern of differences across grades. Table 2 confirms the general trends displayed in Figure 1 and also shows the differences in syntactic complexities across grades. Table 2 reports Pearson Product Moment correlations for occurrences of each structure and the total number of structures for each publishers' series. Table 2 also shows the correlation of the sums, or total number, of structures for each publisher. The higher the correlation, the more the structure accounts for the difference in complexities across grades.

Although all of the correlations for sums of structures are high, Harper & Row's is the highest ($r = .99$). Inspection of the columns for each publisher's series shows high correlations

Insert Table 2 about here

($r = .72$ to $r = .98$) for 10 structures and no negative relationships in the Harper & Row series. In contrast, in the Open Court series, only seven structures account for the differences across grades and two, VDCS and PBIN, decrease in frequency with increases in grade levels (negative correlations). The total number of structures in Open Court also has the lowest correlation ($r = .88$) across grades, for the four series.

The specific structures which account for the differences across grades in each publisher's series can be identified by finding those that have high ($r = .70$ to $r = .90$) and moderate ($r = .50$ to $r = .69$) correlations. Three of the structures, RCPP, NOM, and PV, have high correlations with changes over grade for all four publishers. Four, RRCPS, RRCPD, RACPS, and NVDCC, have

Table 2

Correlations of Frequency of Each of 16 Syntactic Structures with All Other Structures Across Grades 1-6 for Each Series of Readers

Structure	Series of readers (r)			
	Open Court	Houghton Mifflin	Harper & Row	Holt
RRCPS	.63	.93	.54	.75
RRCPD	.50	.90	.98	.86
RACPS	.84	.49	.72	.88
RACPD	.90	.10	.76	.69
RCIV	.38	.59	.89	-.18
RCPP	.89	.99	.95	.91
NDCV	.12	.91	.88	.63
VDCS	-.16	.33	.33	.52
NVDCC	.79	.60	.82	.89
NDIV	.43	.42	.59	-.74
EDM	.39	.87	.55	.70
NOM	.82	.98	.93	.80
PBIN	-.17	.79	.39	.74
IF	.31	.21	.25	.43
PV	.79	.72	.85	.87
NVDMC	.65	.44	.78	.47
SUM	.88	.94	.99	.94

correlations which were high or moderate in all the series. These are the structures which increase in frequency from grade to grade with most consistency. The seven structures discriminated most effectively the increases in complexity across grades.

Four structures had low or negative correlations for two or more publishers. RCIV was low for Open Court and negative for Holt. PBIN was negative for Open Court and low for Harper & Row. IF had a low correlation for all publishers. VDCS had a negative correlation for Open Court and a low correlation for Houghton Mifflin and Harper & Row. These structures are, therefore, likely to appear at any grade level with a very variable frequency.

For the other five structures the picture is very mixed. Their correlations with total grade level changes varies from negative to high for all the publishers.

Most of the 16 structures selected for identification account for much of the difference across grades within each series. This is shown by the number of high and moderate correlations for structures for each publisher: nine for Open Court, 10 for Houghton Mifflin, 13 for Harper & Row, 12 for Holt. This finding supports the conclusion that the 16 structures selected do form part of the publishers' general idea of increasing syntactic complexities in readers as children progress through the elementary grades.

The publishers vary considerably in which syntactic structures they use to increase the complexity of their readers. This can be observed by looking at the rows in Table 2. Only RCPP, NOM, IF, and PV show a fair amount of consistency in their correlations. There is evidently no agreement on which grammatical structures need to be introduced gradually because they make language too complex for young children to comprehend. It should be noted, however, that there is no conclusive evidence from basic or applied linguistic research which would provide clear guidelines as to optimum timing for introduction of particular grammatical structures into reading material.

The third question asked for the differences in frequencies of particular structures at succeeding grade levels. Table 3 shows which structures increased significantly ($p = .05$) in a two-tailed multinominal test for differences in succeeding grade levels for each of the four publishers. The data in Table 3 pinpoint sudden jumps within the overall trends displayed in Figure 1, Table 1, and Table 2.

Insert Table 3 about here

The series vary considerably in their choices of syntactic complexities which increase gradually, not at all, or at a level of

Table 3

Syntactic Structures Which Increase Significantly ($p = .05$) in Frequency at Succeeding Grade Levels in 4 Series of Readers

Structure	Grades Where Structures Increase Significantly in Series			
	Open Court	Houghton Mifflin	Harper & Row	Holt
RRCPS	2>1			4>3
RRCPD	3>2			
RACPS			6>5	
RACPD		3>2	6>5	4>3 6>5
RCIV				
RCPP	5>4 6>5		3>2	2>1 6>5
NDCV				2>1
VDCS	6>5	3>2 4>3	6>5	
NVDCC	2>1	2>1 3>2 6>5	3>2	
NDIV			6>5	
EDM	3>2	2>1	4>3	
NVDMC	6>5	2>1		4>3 6>5
PV	6>5	2>1	4>3	2>1
PBIN	4>3			6>5
IF			2>1 5>4	
NOM	4>3	2>1		

statistical significance. Depending on which series they use, children will find significant increases in various relative clauses as they move to each grade. They will also find significant increases in some structures of coordination with deletion(s) in every successive grade except when they proceed from fourth to fifth.

No pattern could be found to describe the types or combinations of structures which increase significantly from grade to grade. There was no evidence of planning within a series or among the publishers for a selection of the grades when sharp increases in the presentation of a grammatical pattern would be best. For example, Houghton Mifflin and Holt increase the number of passive verbs significantly in second grade, while Harper & Row does this in fourth. Open Court increases one type of relative restrictive clause significantly in second grade and another in third, but Houghton Mifflin and Harper & Row never increase relative restrictive clauses significantly.

Counting up the number of structures which increase significantly between two successive grades, it can be seen in Table 3 that the largest number appear between the first two grades (11) and the last two grades (13). Eight structures increase significantly from second to third grade and also from third to fourth; only two structures increase significantly from fourth to fifth grade. These data not only specify the structures which account for the increases in the number of complexities in succeeding grades but also provide statistical support for the slope of the lines in Figure 1. There it was apparent that the sharpest sum if increases occur between the first two and the last two years of elementary school.

The fourth question asked if there was a difference in frequency of occurrence of particular structures among the four publishers. Table 4 shows significant differences of occurrences of syntactic structures among the four series, with $p = .05$ in a two-tailed test. Chi square tests of significance for three degrees of freedom were calculated for those structures which occurred more than 20 times among publishers in each grade and, for greater accuracy, the probabilities for chance distribution of structures which occurred less than 20 times were taken from a multinomial distribution program (Harshbarger, 1971). For all structures which occurred fewer than six times among all publishers in any grade, the differences were non-significant.

Insert Table 4 about here

The extent of the variability among the publishers in the number and kinds of complexities they present in different grade levels is indicated in Table 4. Of the 16 structures that were

Table 4

Significant Differences (p = .05) of Frequency of Occurrences of Syntactic Structures at Six Grade Levels Among Four Series of Readers

Structure	Grade					
	1	2	3	4	5	6
RRCPS		*	*			
RRCPD	*					
RACPS				*		
RACPD			*	*	*	*
RCIV						*
RCPP	*	*	*		*	*
NDCV	*	*	*	*		
VDCS		*	*	*		
NVDCC	*	*	*	*	*	*
NDIV		*		*		
EDM	*		*		*	*
NOM			*	*		*
PBIN	*	*	*		*	
IF				*		
PV			*			
NVDMC				*	*	

identified in each grade level, there was a significant difference among the publishers in 45% of the structures. The greatest variability occurred in third grade where 62% (10 of the 16 structures) and in fourth grade where 56% of the structures (9 of the 16) varied significantly. Evidently it is in these years that there is the least amount of agreement about which grammatical patterns should be presented to children.

Table 4 also shows that across the grades there is some consistency for frequency of relative restrictive clauses with pronouns either stated or deleted and for relative appositive clauses with pronouns stated. There is also considerable consistency in the frequency of use of infinitives (both RCIV and NDIV), passives, if clauses, and noun and verb deletions in the miscellaneous clauses. Where statistically significant variability does occur for these structures it is usually at intermediate rather than at primary grade levels.

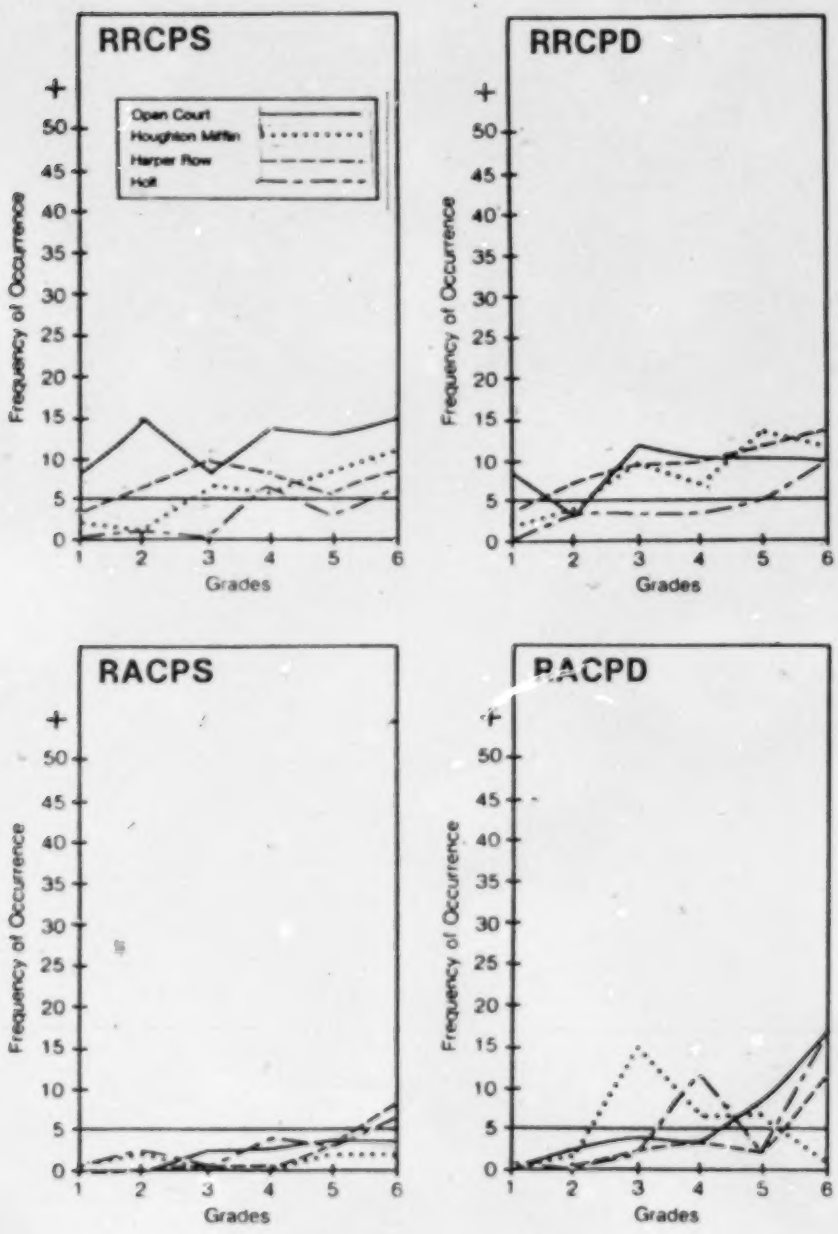
It can also be observed that in the third and fourth grades there is significant variability for all of the conjoined clauses but a mixed pattern for the relative clauses as a group. For the remaining syntactic complexities the pattern of variability is mixed.

Statistically significant differences are useful because they reveal variation in a form which is understandable and acceptable to the research community of a discipline. As a practical matter, however, we are interested not only in statistically significant variability in the data, but also in the actual numbers of occurrences of each structure that children will encounter in each school year. Then we can begin to ask at what point the occurrence of a particular structure is so frequent in a text that it is essential for children to understand it in order to be able to read with comprehension.

Figure 2 shows the frequency of occurrence of each structure in each grade for each of the four series. It is being assumed, preliminary to conclusive research, that if a structure appears five times or more in 100 sentences, then failure to comprehend that structure may seriously impair a child's ability to understand the passage. On the other hand, if a structure occurs fewer than five times in 100 sentences, there may be enough lexical and syntactic information in other parts of the passage for comprehension. The infrequent occurrences of a structure may even provide practice in linguistic processing. Of course, this rule of thumb should be considered tentative and will be tested in a later study. Meanwhile, we will assume in reporting the present data, that occurrence of a structure five or more times in 100 sentences constitutes a critical point for reading a passage with comprehension.

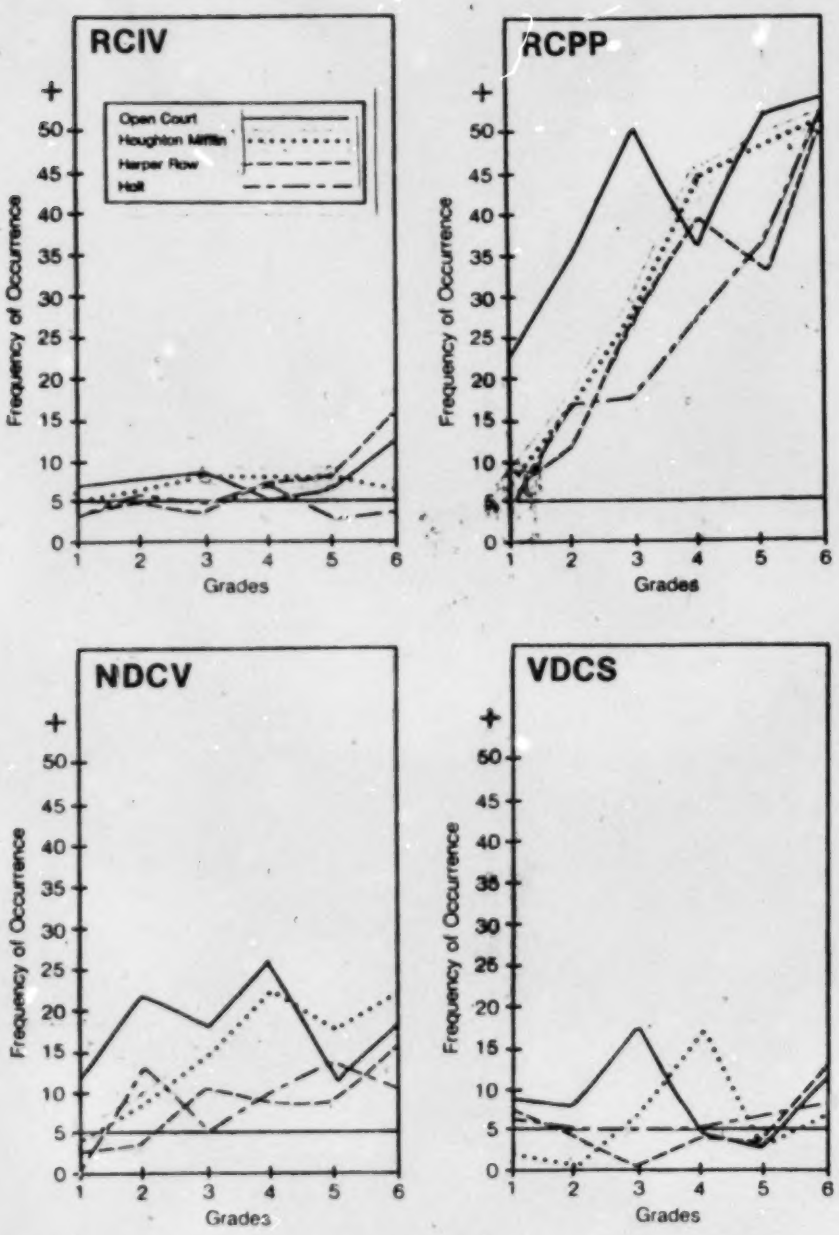
Insert Figure 2 about here

Figure 2 (a)
Frequency of occurrence of 16 syntactic structures
in Grades 1-6 in 4 series of readers



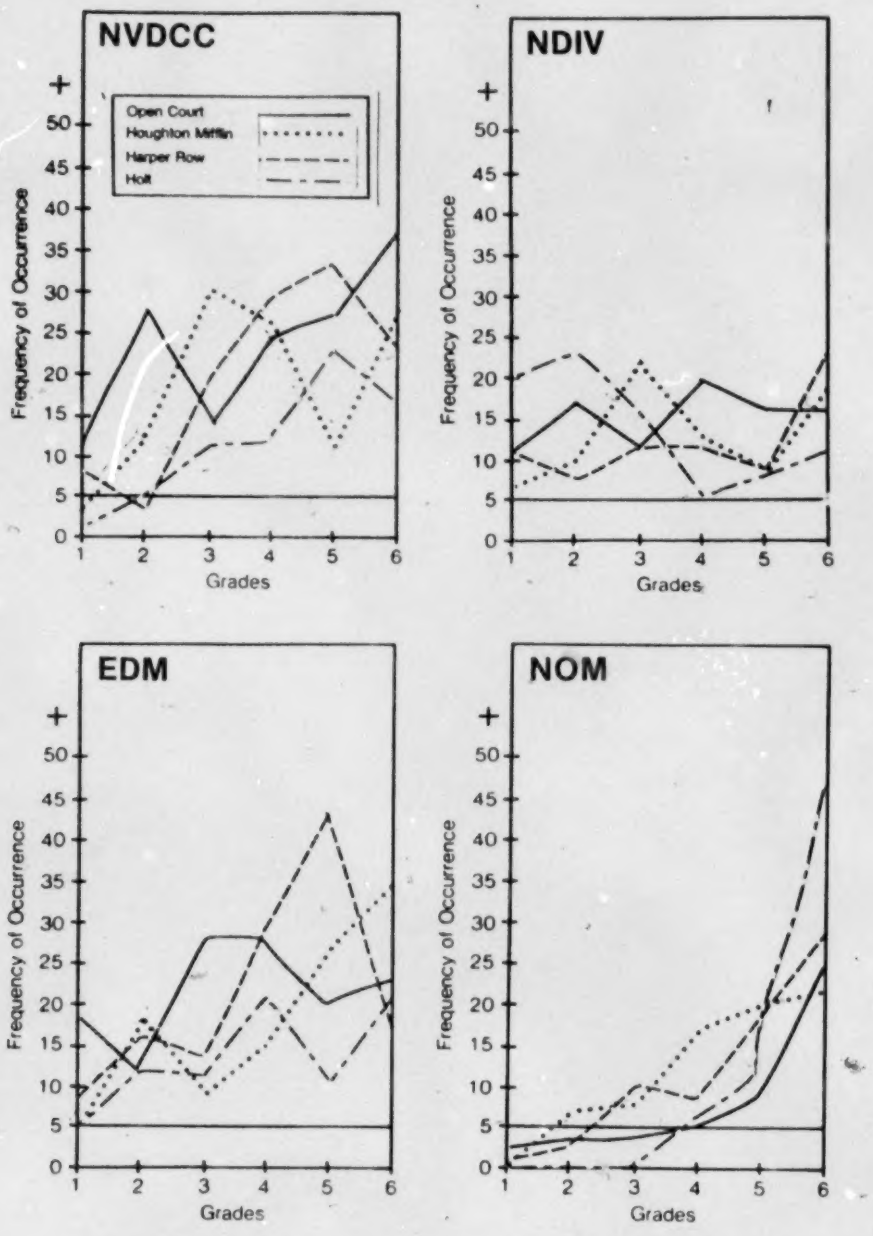
Note: Horizontal line at 5 occurrences indicates possible critical point for comprehension.

Figure 2 (b)
Frequency of occurrence of 16 syntactic structures
in Grades 1-6 in 4 series of readers



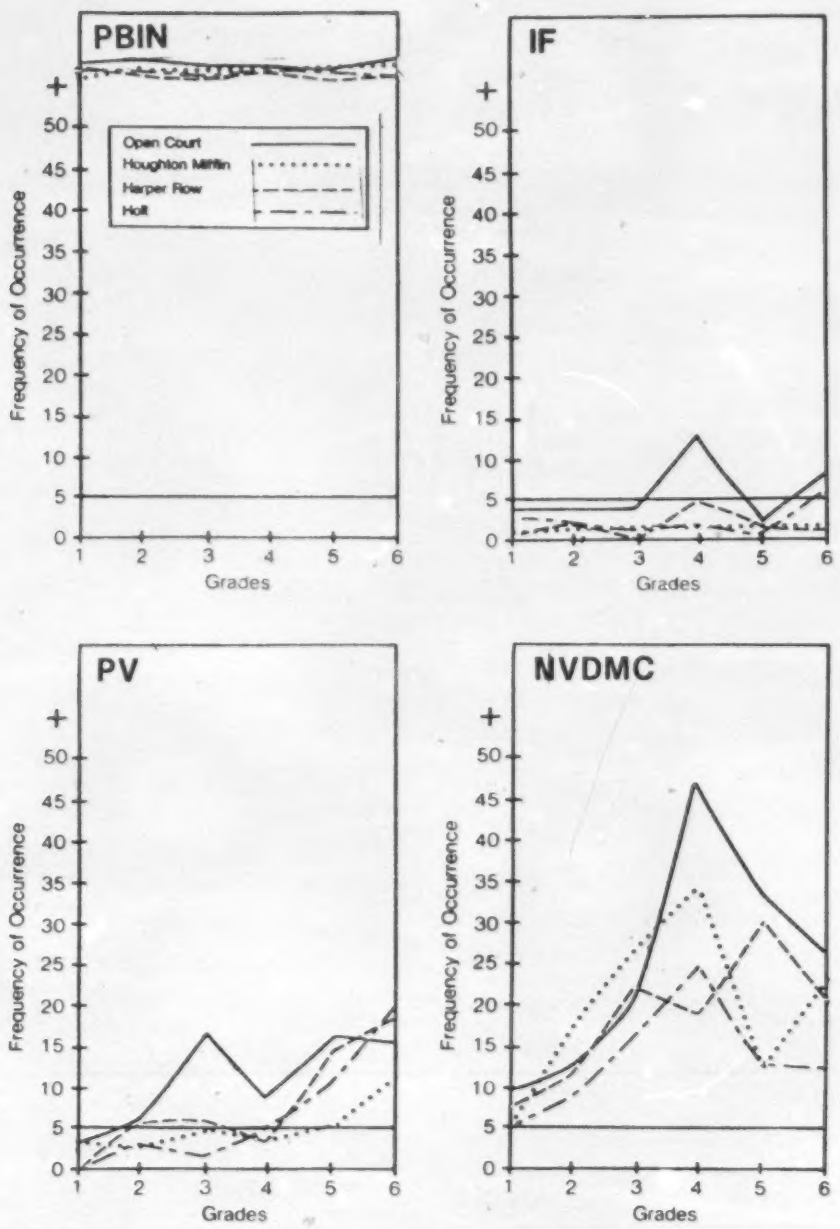
Note: Horizontal line at 5 occurrences indicates possible critical point for comprehension.

Figure 2 (c)
Frequency of occurrence of 16 syntactic structures
in Grades 1-6 in 4 series of readers



Note: Horizontal line at 5 occurrences indicates possible critical point for comprehension.

Figure 2 (d)
Frequency of occurrence of 16 syntactic structures
in Grades 1-6 in 4 series of readers



Note: Horizontal line at 5 occurrences indicates possible critical point for comprehension.

In Figure 2, a line has been drawn on each graph so that the critical point for each structure can be seen for each of the four series in each grade level.

Looking at the graphs in Figure 2 it is evident that of the sixteen structures identified in this study, only IF and RACPS stay for the most part well below the critical point of five. Some structures, PBIN, NVDMC, NDIV and EDM and, with one exception, RCPP, start off above five in the first grade and remain high in frequency throughout the six grades for all four publishers. The remaining nine structures start below five in the first grade and rise in frequency in the succeeding grades, with many ups and downs in the middle grades. The grade at which they cross the critical point of five varies among the publishers.

The coordinating structures, NVDCC, VDCS, and NDCS are all above five by first, second, or third grade. The relative constructions, RRCPS, RRCPD, RACPS, RACPD, RCIV, and RCPP are not consistently above five until the later grades. PV, NOM, and RCPP have the most consistent rise in number of structures from first to sixth grade, which suggests that they are considered by the series' authors to be too difficult to be used in the early grades. PBIN, on the other hand, which starts very high and remains high, is evidently considered easy for children to understand, despite evidence to the contrary (Hawkins, 1969).

The wide divergencies in frequencies of occurrences in the middle grades confirm the statistical variability shown in Table 4. The peaks on the graphs, showing frequencies above the critical point of five in 100 sentences, further indicate the most of the structures appear often enough so that processing them may be crucial to reading with comprehension. Evidently, then, despite the uncertainties that the structures are appropriate for third and fourth graders' comprehension, publishers present them often.

Discussion

It should be expected that materials presented to children would increase in complexity as the children progress through school grades. This study found that the total number of the syntactic complexities which had been selected for identification in reading texts do increase in occurrence from first to sixth grade. A striking finding of the study was that the increases are not systematic. No published series shows evidence of planning for gradual increases of specific structures. Nor could patterns be found for increases in combinations of syntactic structures. Among the series there is a great deal of variability in the grade level at which any structure is introduced and the frequency with which it occurs at succeeding grade levels.

The general trend of increases of all the syntactic complexities across the six grades seems to represent the effort of publishers to start with less complexity for beginning readers and to increase this as children mature. The variability both within and among the published series may reflect the meager state of knowledge of language development of children. There is no certainty at the present time about the ages at which children can be expected to be able to process certain syntactic structures. Neither is there certainty about how much the failure to process any one structure contributes to failure to comprehend a reading selection of a given length. We do know, however, that language development is sequential and that understanding syntax is related to comprehension of language. We also know that there are numerous failures among school children in their ability to comprehend written language. Therefore, it seems reasonable to hypothesize a relationship between understanding syntax and understanding reading and to test such a hypothesis.

Good candidates for the structures to be tested and the age of children (or grade levels) to test, emerged from the study. The results show that there are sharp increases in the number of complex structures in most of series from first to second grade and then a leveling off of increases until fifth grade (Tables 1 and 3, Figures 1 and 2). It was observed during the study that the content of the materials in the third grade readers began to shift to more abstract topics, further removed from daily experiences of children and including non-fiction. The content may, of course, require more formal, complex language as an appropriate style. Figure 2 shows that most of the syntactic complexities occur at frequencies above the critical level (five or more times in 100 sentences) at third and fourth grade. Furthermore, most of the variability in frequency of occurrence of specific structures among publishers also occurs in third and fourth grade attesting to the uncertainty of use of the complexities. It may be that the combination of content and the number of syntactic complexities contributes to the decline of progress in reading ability which is manifested in reading test scores in these school grades.

Therefore, it is recommended that research be undertaken to test children's understanding of the structures which appear above the critical level of frequency and also vary significantly among the series in the third grade. This level, rather than fourth grade, is recommended to anticipate the reading difficulties which seem to increase among pupils in the intermediate school years. If the results of the research show evidence of difficulty with the structures, then instructional measures can be devised to try to prevent continued decline of reading abilities. The structures which meet the criteria for testing are the two relative restrictive clauses (RRCRS and RRCRD) and the reduced relative clause in prepositional

phrase form (RCPP), the three coordinated clauses with deletions (NDCV, VDCS, and NVDCC), the miscellaneous clauses with either a noun or verb or both noun and verb deleted (EDM and NVDMC), nominalizations (NOM), pronouns whose antecedents are not the immediately preceding nominal (PBIN), and passive verbs (PV). It is interesting to note that if clauses occur infrequently. The concern of sociolinguists that the variant Black English form, (I asked him did he go, rather than I asked him if he went) could be a significant obstacle to comprehension, is not confirmed by the data.

The testing should include both understanding of the structures in sentences and the effect of that understanding on comprehension of written discourse longer than a sentence. If the discourses are controlled for other syntactic complexities, then a toleration for complexities can be identified. The results of such a study would provide specific information for future production of materials for reading instruction texts, both for the content of the texts and any appropriate directions for teachers.

Meanwhile, in the absence of such research, teachers may find it useful to scrutinize the data in the present study and examine the books they are using to anticipate their pupils' comprehension problems. If they happen to have any of the four series which have been studied, they can consult Figure 2 to ascertain the frequency of occurrence of each of the structures for their grade level. They might then check, by means of questioning, to be certain that their pupils do understand those structures within reading selections in which they occur. Then instruction can be provided as needed. Teachers who use texts other than the four reported here may find it useful to review their books to identify the same structures in them and then to take similar measures.

At the present time, two additional series of texts are under study to identify the syntactic structures in them. We are also analyzing stardardized reading tests to find out if the structures there correspond to the syntax in the books which children have been required to read. The latter data are expected to yield information to help account for some of the decline in progress of reading ability measured by the tests.

It is also recommended, on the basis of the data, that writers and publishers of school readers review the syntactic structures they present to children each year. Good literary style requirements necessitate complex grammar, of course, and simple decreases in syntactic complexity may simply result in repetitive, uninteresting readers. Such a course of action might only compound the difficulties of dull content that were generated by decreasing and controlling vocabulary. However, it could be productive to pace the frequency rate of syntactic complexities more evenly in the

early school years, to be aware of the specific structures that are in the books, and to provide teachers with related instructional suggestions in the manuals which accompany each reading text.

Among the many perplexing and vexing problems in teaching reading is the lack of certainty about optimum conditions for promoting language growth. The evidence to support direct instruction as contrasted with incidental experience is not at all clear (Cazden, 1972, pp. 101 - 142, 236 - 247). Included in the uncertainties are the transfers which can be expected from oral to written language; from children's listening and speaking to reading, and from children's writing to reading. Yet, literacy is too important for participation in our society to neglect any route that will bring more of our school children beyond the levels of marginal literacy. Too many youngsters are in high schools and still reading at elementary levels. Schools would probably be well advised to pursue every avenue that is known to contribute to language growth and that may increase reading ability. This would include reading to children to offer experience with written language forms, generating excitement and interest in language structures to encourage efforts to solve linguistic problems in reading, developing related writing and reading programs to explicate syntactic structures, and stimulating extensive reading beyond instructional texts to provide for practice in processing a variety of language forms. Direct instruction for comprehension of syntax in readers should also be part of school programs because this by itself would probably facilitate language growth and encourage supplementary reading experience.

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